

Improving surface PM_{2.5} forecast using an ensemble of satellite data, chemistry transport model outputs, and surface observations

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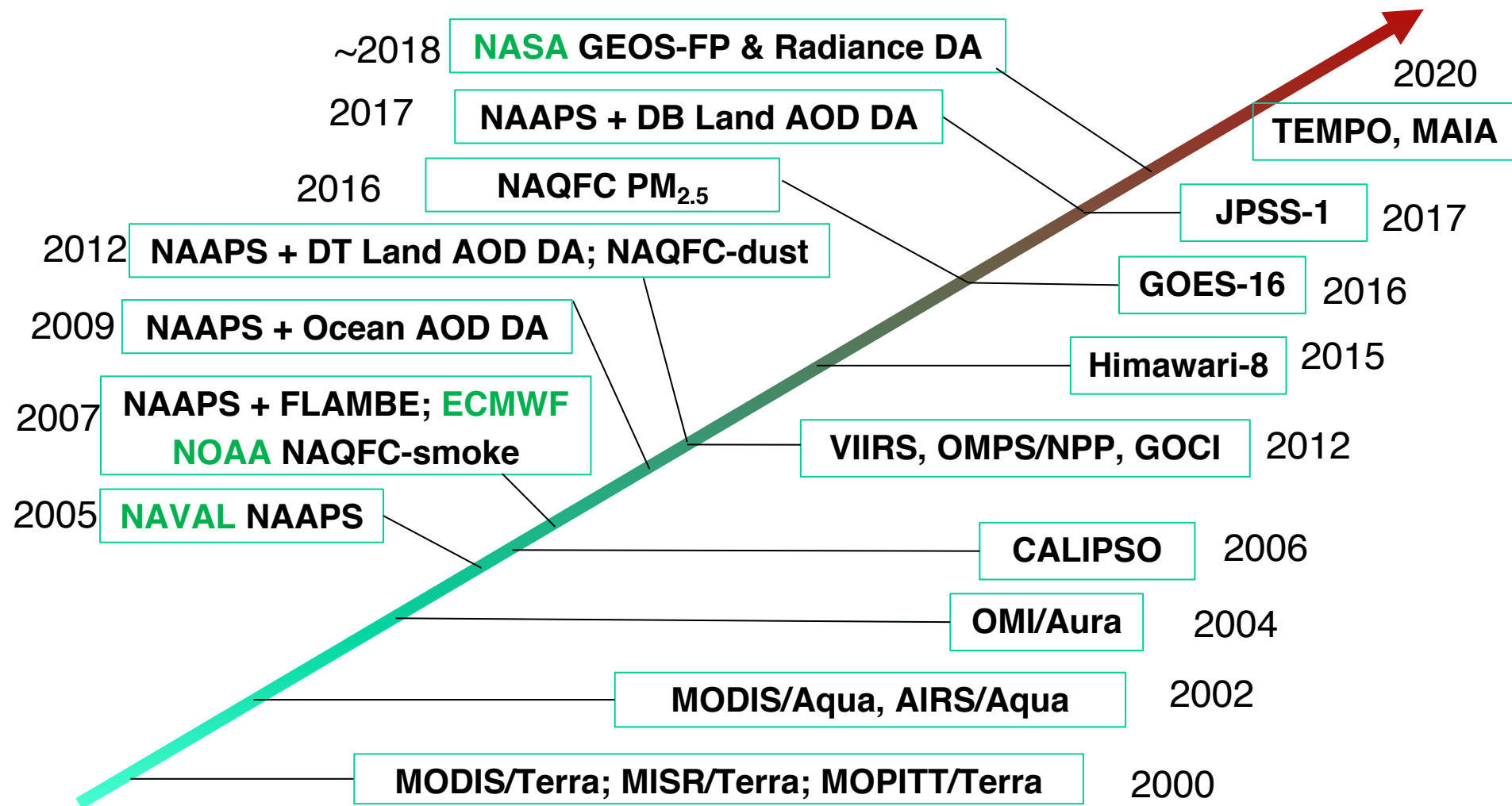
⁴U.S. Environmental Protection Agency, Hampton, VA, USA



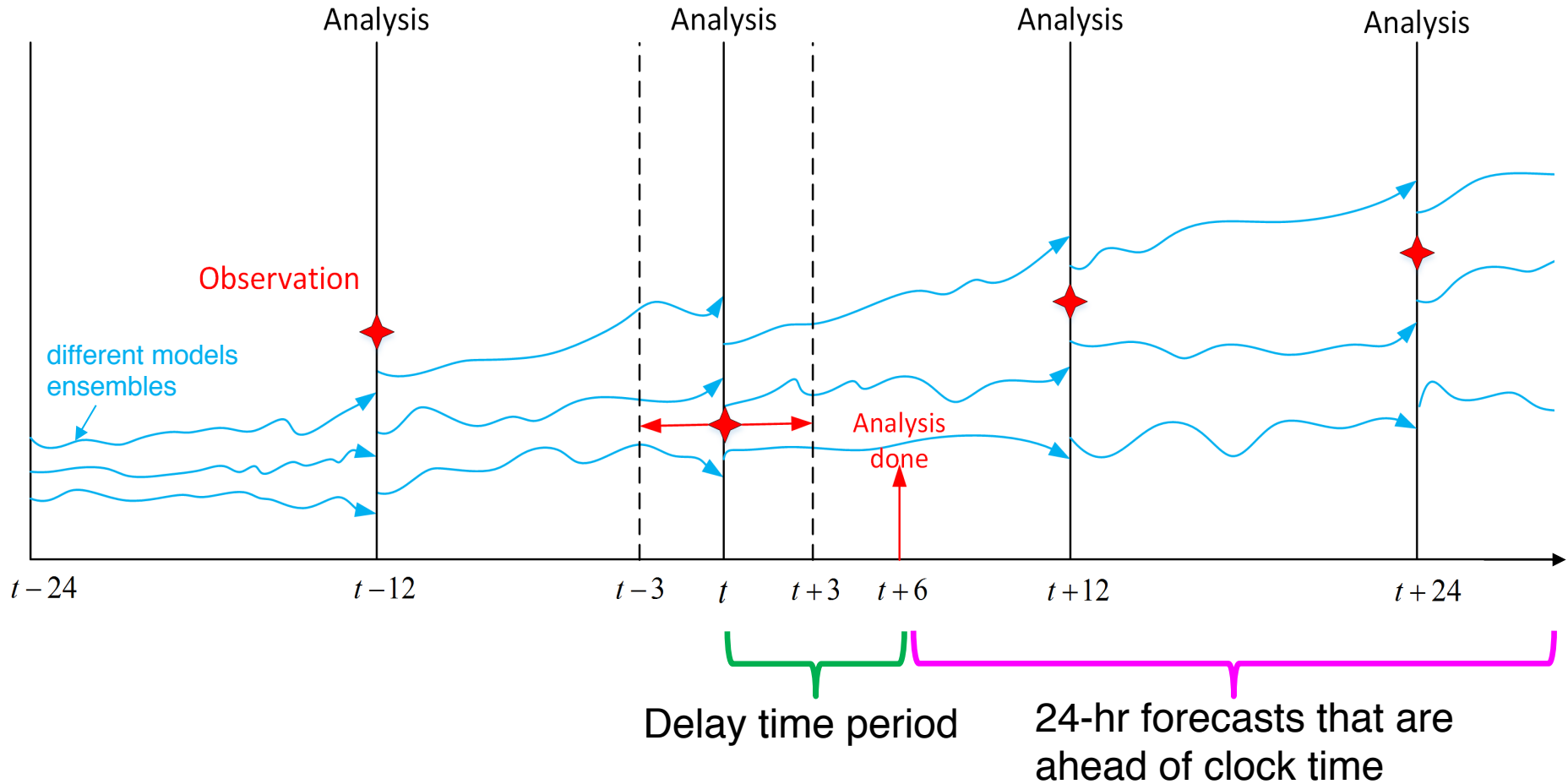
4 Jan 2019
Phoenix, AZ



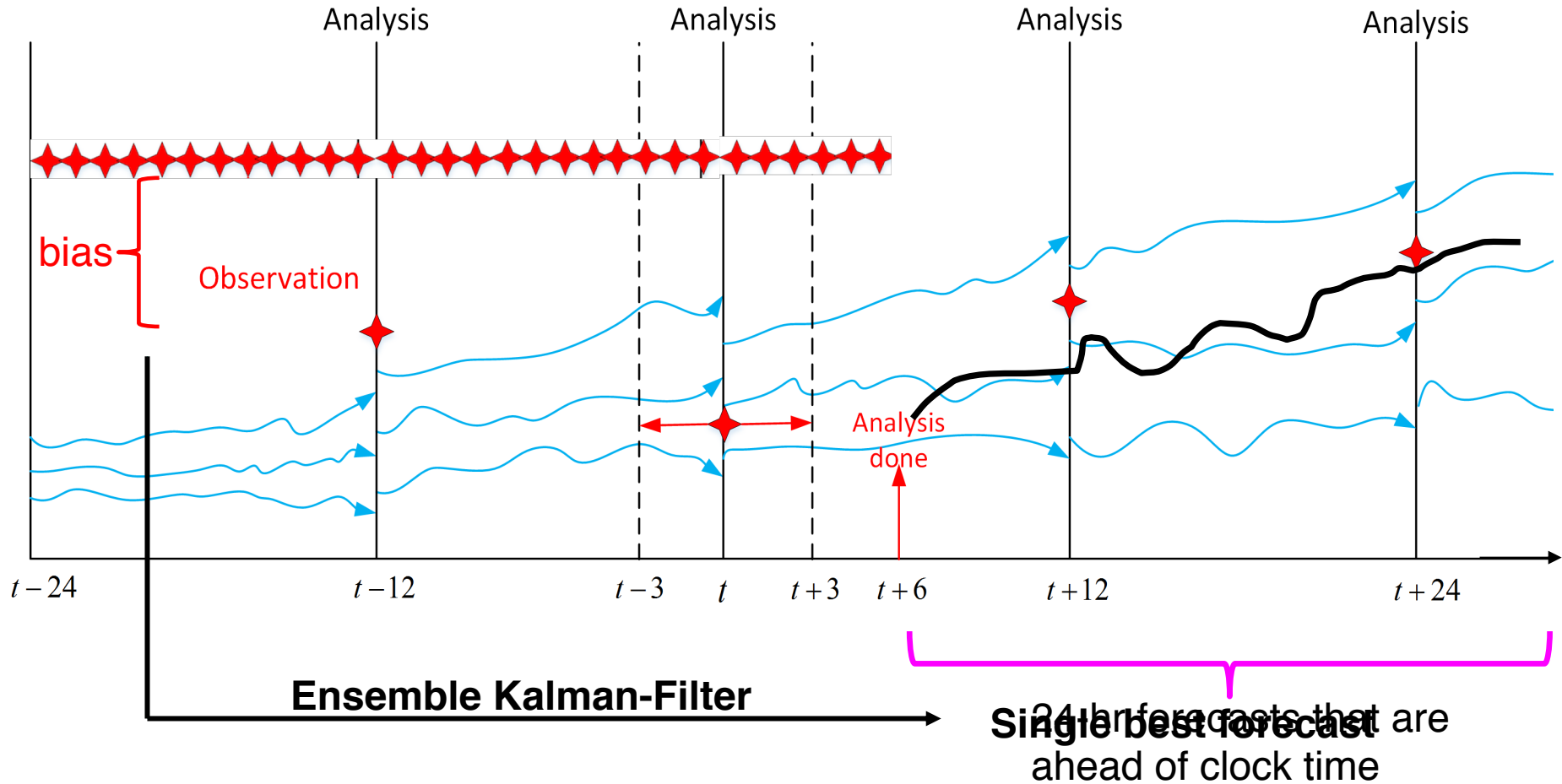
An era of multiple **operational forecasts** & satellite data of aerosols



Global forecast scheduling cycle

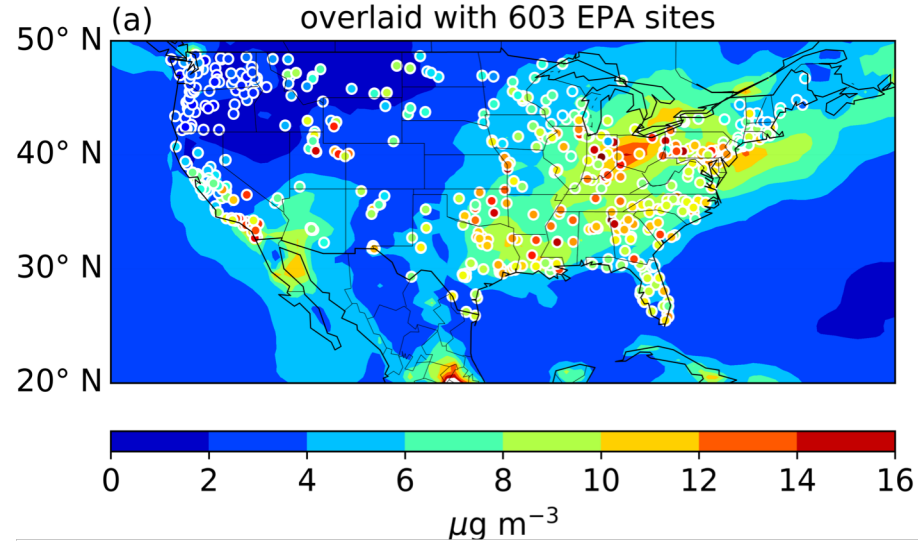


Enabling single best and rapid AQ forecast and advisory through model output statistics (MOS) techniques

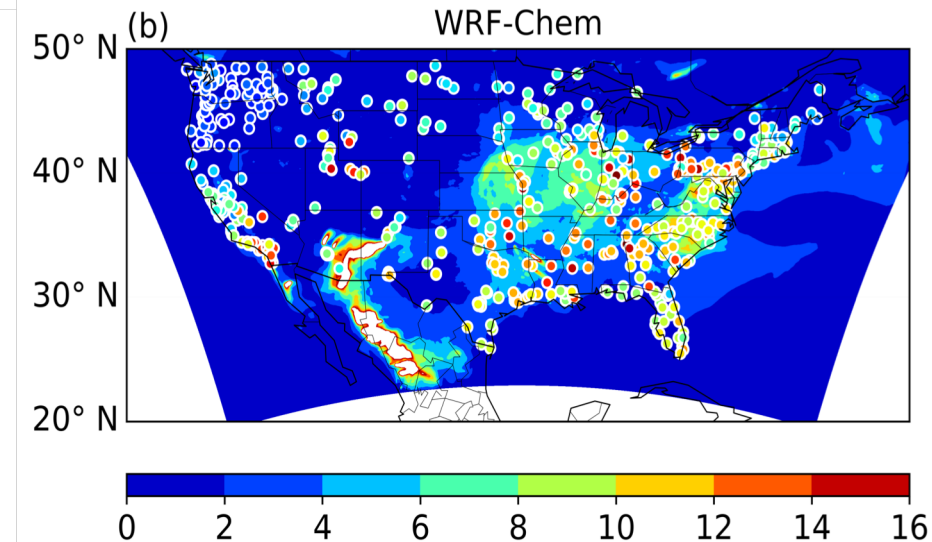


Case study: June, 2012

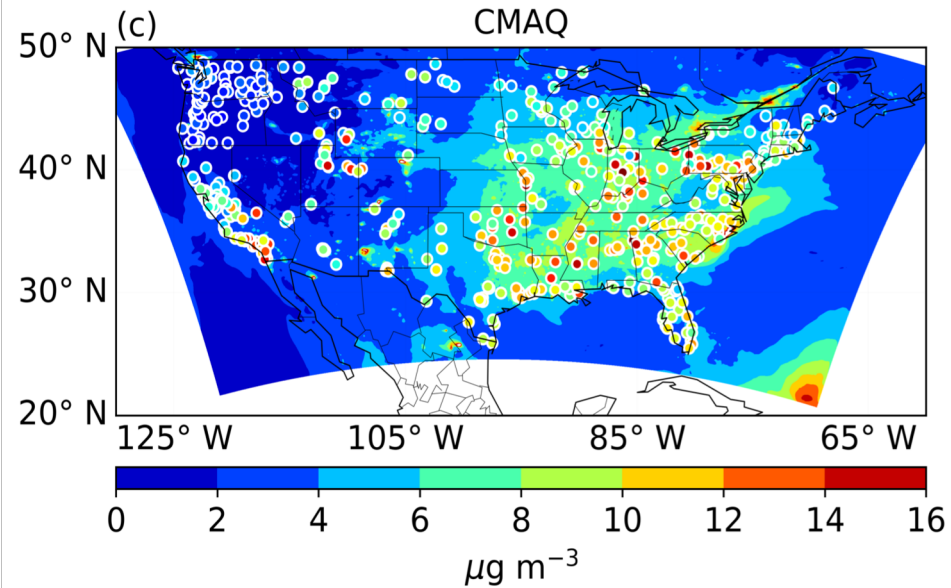
Monthly GEOS-Chem PM_{2.5}
overlaid with 603 EPA sites



WRF-Chem



CMAQ



Different models have different strengths and weakness

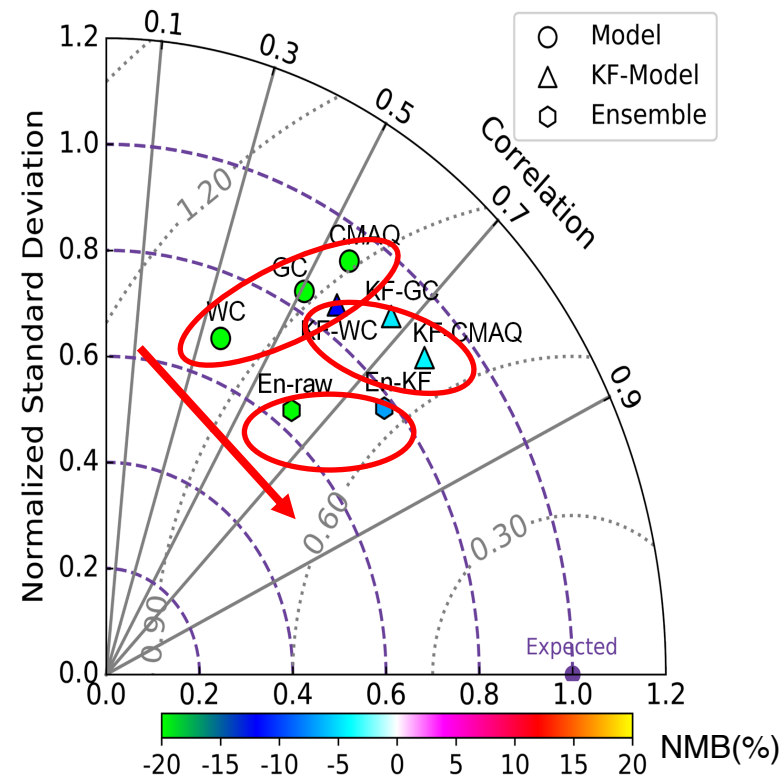
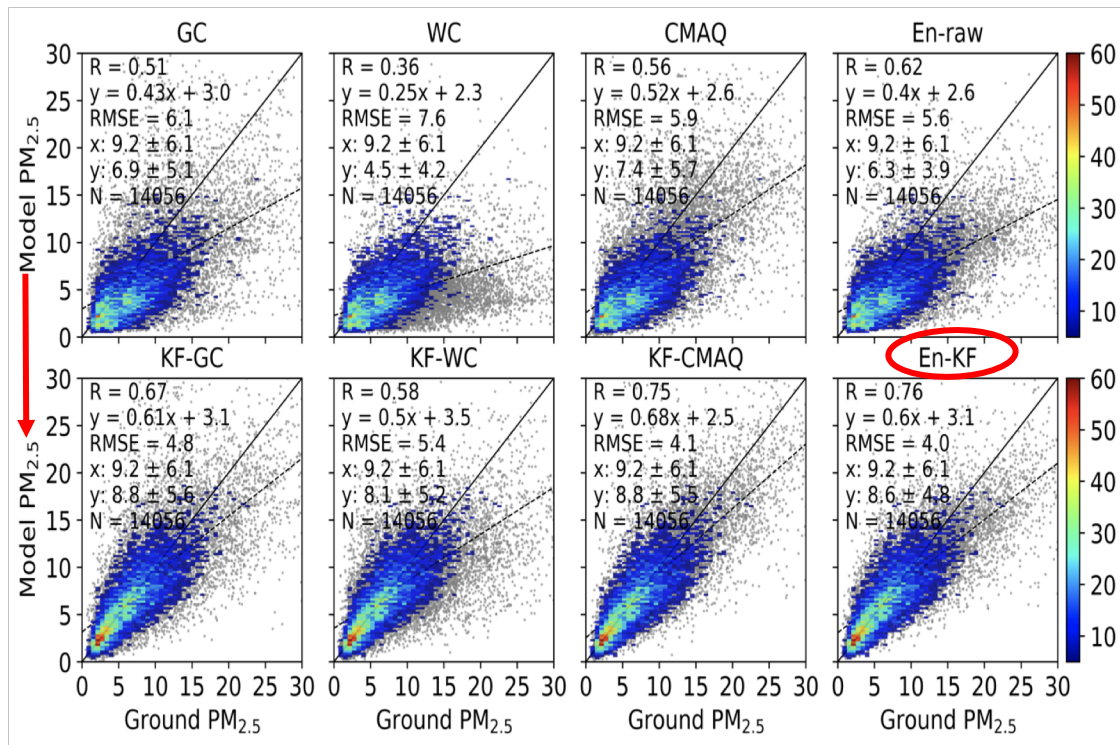
Monthly EPA: $8.80 \pm 3.65 \mu\text{g m}^{-3}$

Monthly GC: $6.61 \pm 3.28 \mu\text{g m}^{-3}$ (-25%)

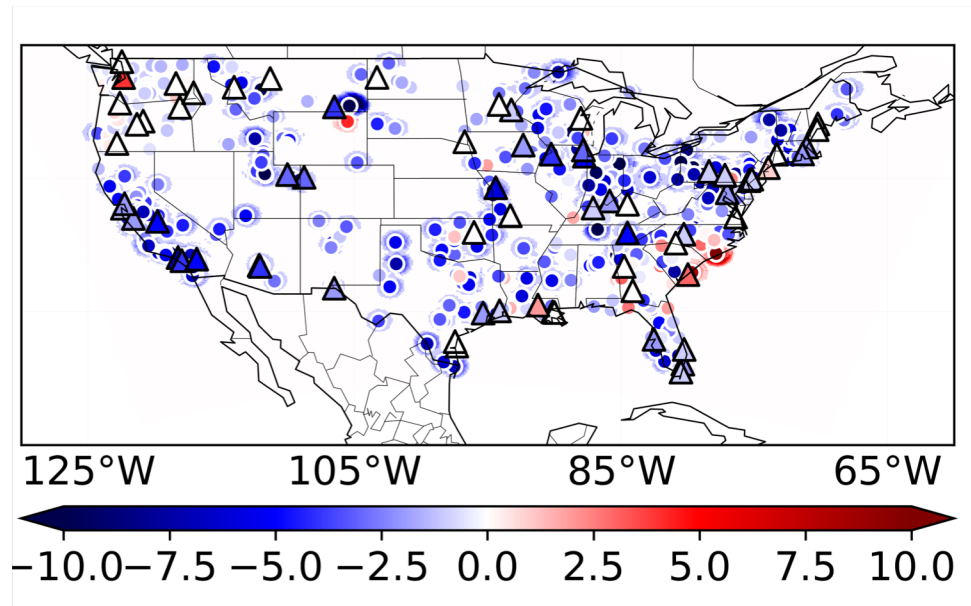
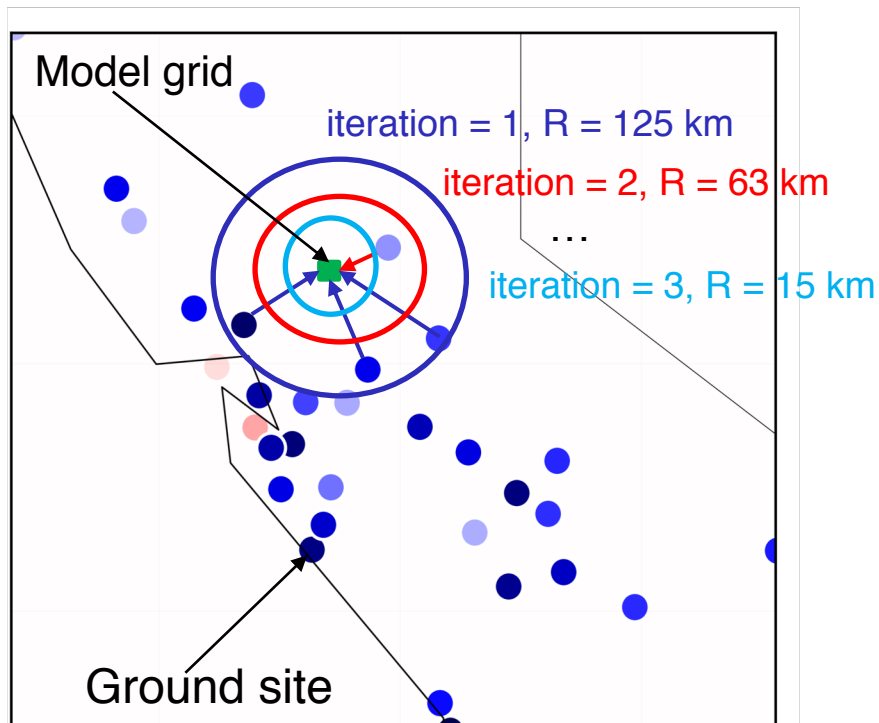
Monthly WC: $4.37 \pm 2.57 \mu\text{g m}^{-3}$ (-50%)

Monthly CMAQ: $6.94 \pm 3.30 \mu\text{g m}^{-3}$ (-21%)

Step 1. forecast bias correction at surface observation sites with Kalman-Filter (KF) ensemble approach

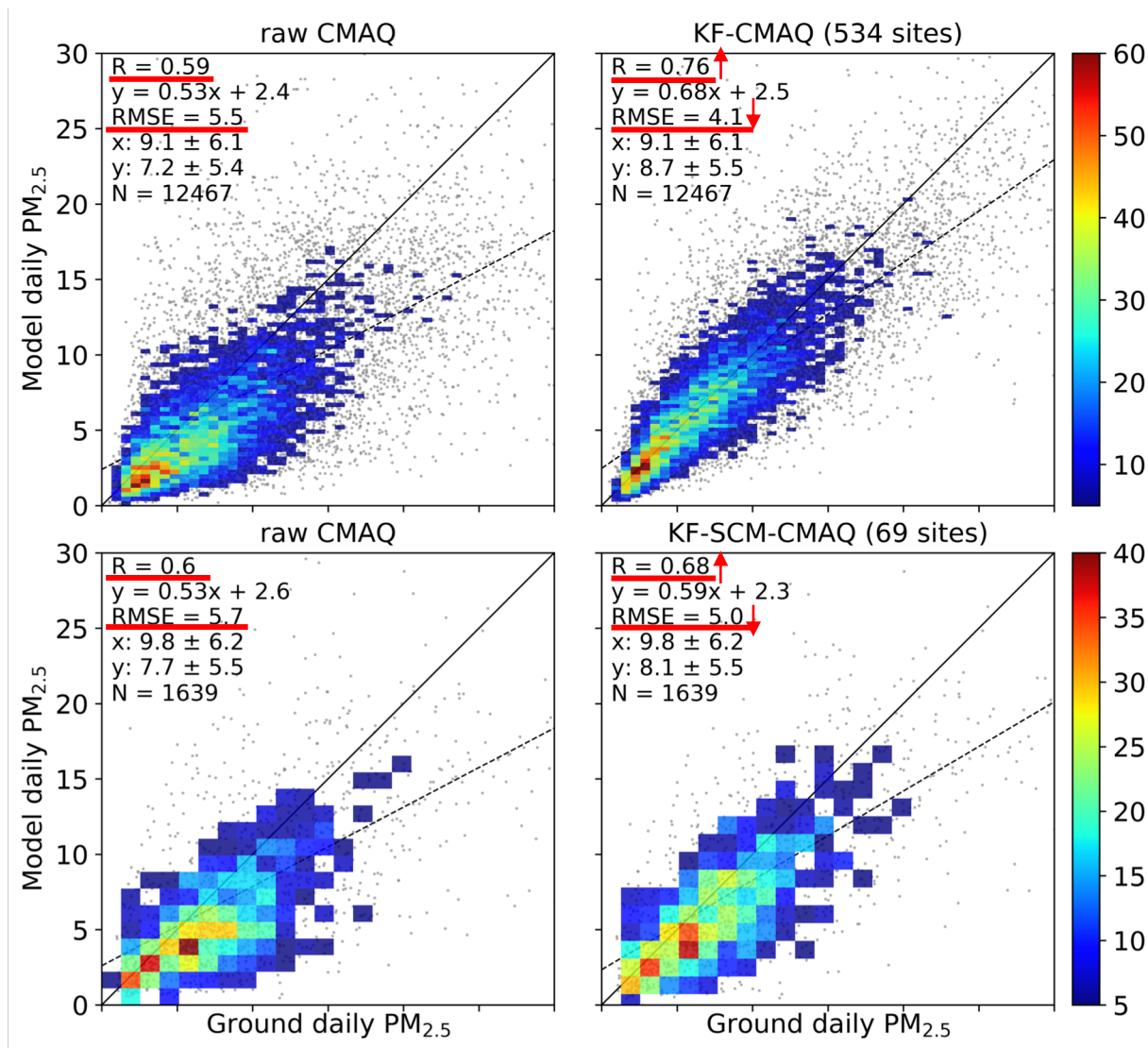


Step II. **Forecast** bias and pattern correction at locations that have no ground-based sites



KF-SCM sites

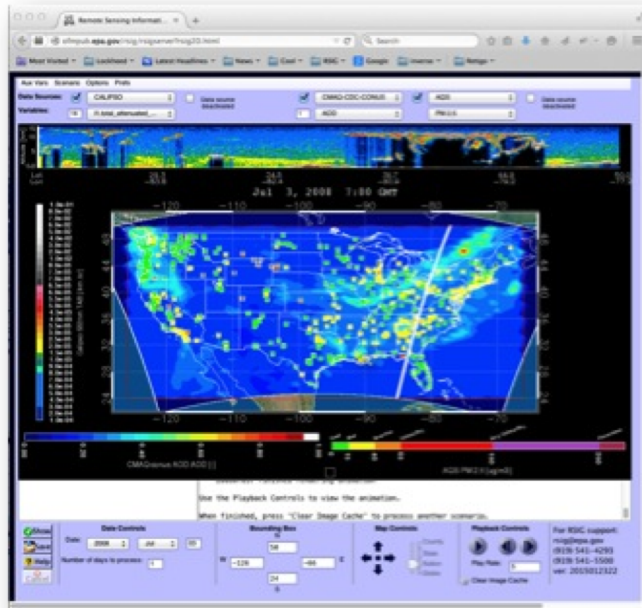
Evaluation sites



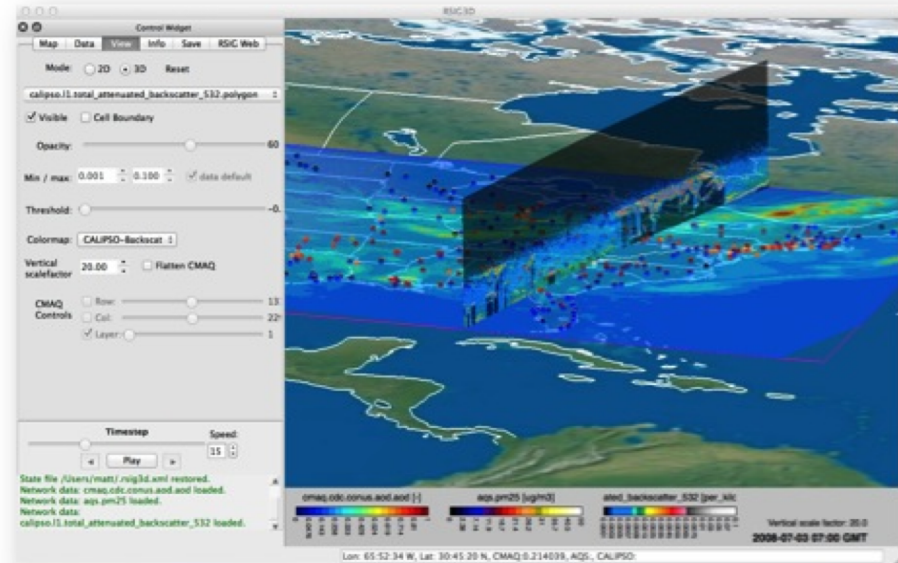
Outlook: Application for EPA's RSIG Remote Sensing Information Gateway

A webservice & application for quick easy access to subsets of
Petabytes of air quality data.

<https://www.epa.gov/hesc/remote-sensing-information-gateway>



RSIG2D



RSIG3D

Thank you !

